

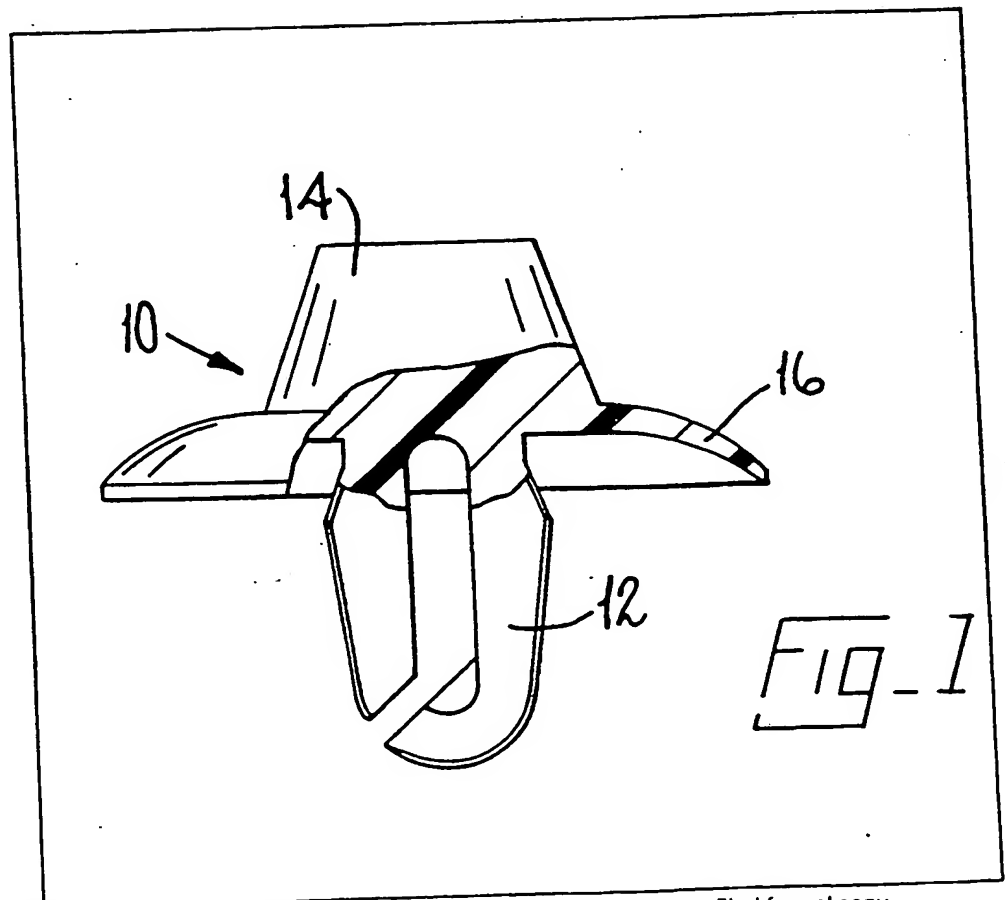
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(54) Friction welding

(57) In a method of securing a plastics fastener stud 10 to a compressed fibre pad, an end portion 14 of the stud 10 is spun at high speed in contact with the pad while pressing the stud against the pad so that it penetrates into the fibrous mass. The end portion of the stud fuses and becomes bonded to the fibres to a substantial depth. The spinning is effected by inserting the stud in a rotary chuck of a high speed electric drill.

The method is useful in attaching studs to trim pads for lining car doors.



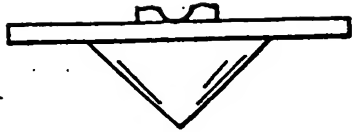


Fig. 3a

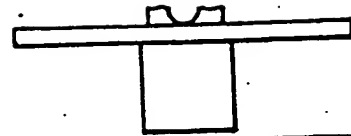


Fig. 3b

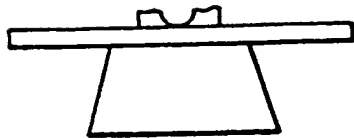


Fig. 3c

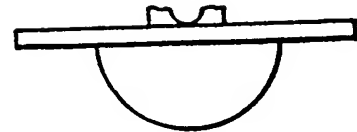


Fig. 3d

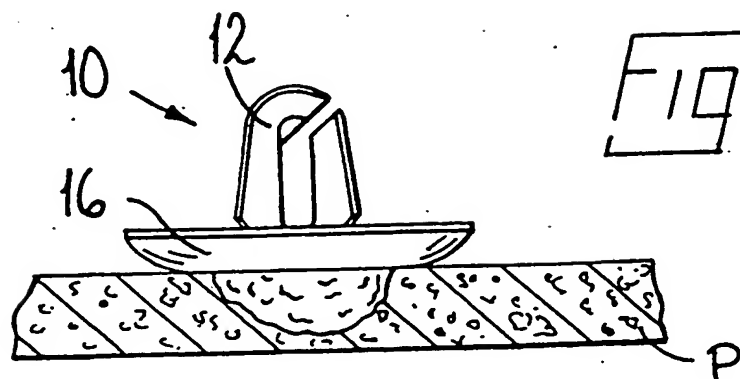


Fig. 4

pip (not shown) to avoid displacement of the stud over the surface of the pad. The leading end portion of the stud, pressed against the pad, penetrates the pad material and becomes fused and firmly bonded to the surrounding fibres to a substantial depth. The drill is stopped when the skirt 16 reaches the surface of the pad.

Where the pad is a bonded mixture of fibres for use for trim pads, for example one in which random laid fibres (e.g. cotton) have been mixed with a partially cured phenol-formaldehyde novolak resin and pressed between hot platens with hexamine until the resin has fully cured, the stud is found to be securely anchored to the pad without marring what will be the exposed surface of the pad, which may have an integral decorative finish before application of the stud. The depth of penetration of the leading end portion 14 of the stud ensures that the pad does not readily de-laminate when an attempt is made to pull the stud from it.

The desired number of studs having been secured to the pad at the desired localities, the pad may be presented to the panel of a car door and the shanks of the studs pressed into their receiving holes. The pad may be detached from the panel as so required without any risk of the studs becoming dislodged from the pad.

It is not essential that the leading end portion of a stud in accordance with the invention is frustoconical. Alternative shapes are shown in Figure 3, viz., (a) conical with an apical angle of about 90°, (b) cylindrical (c) frustoconical but with the large end leading and (d) hemispherical.

CLAIMS

1. A method of securing a plastics fastener to a pad of compressed fibrous material comprising the step of pressing a leading end portion of the fastener against the pad while rotating the fastener at high speed (i.e. in excess of 1,500 r.p.m.) whereby said leading end portion penetrates the pad and becomes fused with the fibres to a substantial depth.

2. A method according to claim 1 wherein the leading end portion of the fastener tapers towards its tip.

3. A method according to claim 2 wherein the leading end portion is frustoconical.

4. A method according to claim 3 in which the fastener has a pip at the centre of the end face of its frustoconical portion.

5. A method according to any one of the preceding claims in which the fastener is made of nylon.

6. A method according to any one of the preceding claims in which the pad consists of a hot-pressed mixture of fibre and thermosetting polymeric bonding agent.

7. A method of attaching a compressed fibre trim pad to a panel (e.g. of a vehicle) by means of studs having shanks inserted into holes in the panel, each stud being secured to the pad by carrying out a method according to any one of the preceding claims, and the disposition of the studs corresponding to that of the holes in the panel into which the shanks are inserted.

8. A stud for use in carrying out a method according to claim 1 comprising an attaching portion extending in one direction for insertion into a panel hole to retain the stud therein, and, extending in the opposite direction, a leading end portion shaped for penetration into a fibrous pad upon high speed rotation of the stud.

9. A stud according to claim 8 the leading end portion of which is frustoconical, tapering towards its leading end.

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